EASA eRules

Easy Access Rules in machine-readable format (XML)
## Agenda

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<td>10:00 – 10:05</td>
<td>Welcome and presentation of the presenters</td>
<td>Anna Ngu</td>
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<td>10:05 – 10:10</td>
<td>Overview of the eRules project</td>
<td>Anna Ngu</td>
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<td>10:10 – 10:20</td>
<td>Data structure in eRules</td>
<td>Anna Ngu/ Steffen Frederiksen</td>
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<td>10:20 – 10:50</td>
<td>The choice of the XML format &amp; how it can be used</td>
<td>Steffen Frederiksen</td>
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<td>10:50 – 11:20</td>
<td>Answering questions received prior to the event</td>
<td>Steffen Frederiksen</td>
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<td>11:20 – 12:00</td>
<td>Answering ad-hoc questions about the XML format</td>
<td>Steffen Frederiksen</td>
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Trigger for eRules

➢ Lack of single source of rules
➢ Complexity of European aviation regulatory system
➢ Inefficiency in internal and external processes

Where is my rule?
What is eRules?

➢ Platform for managing aviation rules based on a Component Content Management System (CCMS)
➢ Easy Access Rules are published from eRules

eRules = structured data

IR  AMC/GM
## Units of information – Lego analogy

<table>
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<th>eRules</th>
<th>LEGO</th>
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<td>Topic modules</td>
<td>Bricks</td>
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<td><strong>Topic</strong></td>
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**Topic (minimal):**
1. Title
2. Metadata
3. Content (text)
4. Only one content type

**Content is divided into topics**

**Topics are assembled into maps**

![DITA map](image1.png) ![Model/building set](image2.png)
Division of the content into ‘topics’

➢ A “TOPIC” is the smallest unit of information that makes sense to the reader, in standalone mode.

26.105 Emergency exit access

Operators of large aeroplanes used in commercial air transport shall provide means to facilitate the rapid and easy movement of each passenger from their seat to any of the emergency exits in case of an emergency evacuation.

CS 26.105 Emergency exit access

Compliance with point 26.105 of Part-26 is demonstrated by complying with CS 25.813(d) to (f) or equivalent, or with the following:

(a) Reserved.

(b) If it is necessary to pass through a passageway between passenger compartments to reach any required emergency exit from any seat in the passenger cabin, the passageway is unobstructed. However, curtains may be used if they allow free entry through the passageway.

(c) No door is installed in any partition between passenger compartments.
Set of metadata attached to every topic
Topic in XML
Map in XML

Export XML (and map) structure
Metadata in XML

```xml
<er:topic
    xmlns:id="1609903351"
    source-title="CS 26.100 Location of emergency exits"
    ERulesId="ERULES-1963177489-2927"
    Domain="Additional airworthiness specifications; Air operations;"
    ActivityType="Aircraft operations;"
    AircraftUse="Commercial air transport (CAT);"
    AircraftCategory="Large aeroplanes;"
    AmendedBy="CS Issue 3;"
    ApplicabilityDate="26 February, 2021"
    EntryIntoForceDate="18 December, 2020"
    EquivalentForeignRegulation="FAA Part-121;"
    ICAOReference="";
    Keywords="MEL"
    RegistryState="EU-registered;"
    RegulatedEntity="Aircraft operator;"
    RegulatorySource="ED Decision 2020/023/R"
    RegulatorySubject="Part-25; CS-25;"
    TechnicalSubjectMatter="ATA 25;ATA 25;"
    TypeOfContent="CS (Certification specification);"
    ParentIr="26.100 Location of emergency exits"
    EASACategory=""/>
```
Easy Access Rules – available in 3 formats

PDF format – from 2017
- Consolidated, structured content
- Ca. 140 consolidated books published on the website

Online publication – from 2020
- Adjustment to mobile views (tablets, phones)
- Online filters to provide a view tailored to users’ needs

XML format
- Machine-readable format – for integration with stakeholders’ applications
Easy Access Rules – available in 3 formats

Regulations

Navigate through the regulation structure by area of implementation. Access detailed information for each individual regulation group by clicking on the title in the first column of the overview below.

**Basic Regulation**

  - **Easy Access Rules:** "Basic Regulation (Regulation (EU) 2018/1139)"

**Initial Airworthiness**

- Commission Regulation (EU) No 748/2012 of 3 August 2012 - Airworthiness and Environmental Certification
  - **Easy Access Rules:** "Airworthiness and Environmental Certification (Regulation (EU) No 748/2012)"

Publications

- [Easy Access Rules for Airworthiness and Environmental Certification (Regulation (EU) No 748/2012)](Online format)
- [Easy Access Rules for Airworthiness and Environmental Certification (Regulation (EU) No 748/2012)](PDF)
- [Easy Access Rules for Airworthiness and Environmental Certification (Regulation (EU) No 748/2012)](XML)

View technical XML documentation
The choice of the XML format and how it can be used
Why XML or why not ...?
Why XML and Why Office Open XML (ECMA-376, ISO/IEC 29500)?

→ Requirements for the EASA eRules export format:
  → Support as many different stakeholder use cases as possible, from the simplest to the most complex
  → High fidelity – no loss of information – no loss of the modular structure
  → Support for content validation
  → Self-contained, one file – encapsulating graphics objects, formulas, even 3rd party formats (e.g. Math, Chemical)
  → Editable, human-readable and machine-readable
  → International standard
  → Fully documented
  → Rich set of editors, tools, and interfaces (APIs) must be available
eRules XSLT transformation example

→ XML to JSON example:

```xml
<json>
  <!["topic" :{
    "metadata" :{
      "source-title" :{"val" : "CS 25.100 Location of emergency exits", },
      "ERulesId" :{"val" : "ERULES-1963177438-2927", },
      "Domain" :{"val" : "Additional airworthiness specifications;Air operations;", },
      "ActivityType" :{"val" : "Aircraft operations;", },
      "AircraftUse" :{"val" : "Commercial air transport (CAT);", },
      "alias" :{"val" : "topic", },
      "id" :{"val" : "1689902351", }
    },
    "content" :{
      "t" :"If one or more emergency exits are deactivated, the distance(s) between the remaining exits is (are) no more than 18.3 m (60 feet) from any adjacent passenger emergency exit on the same side of the same deck of the fuselage, as measured parallel to the aeroplane's longitudinal axis between the nearest exit edges."
    }
  }]
</json>
```
Editors and other tools

→ Editors
  → Any XML or text editor/coding tool that can handle large files (1-10MB)
  → Microsoft Word (as a viewer and quick validator of the format)

→ Other tools and standards:
  → XML DOM, XSLT, XSD Schema, and XPath
  → Open XML SDK
How it can be used?

→ From simple to complex use cases
  → Simply add your proprietary content and formatting, and print
  → Transform as needed and import into existing applications
    → Import into existing regulatory application
    → Import into knowledge portals
    → Import into existing CCMS
    → Import into existing database
    → Automated impact analysis on rule changes (by linking and using ERulesId)
2.4.3 Emergency Exits

Proprietary content ...

26.100 Location of emergency exits

Except for aeroplanes having an emergency exit configuration installed and approved prior to 1 April 1999, operators of large aeroplanes used in commercial air transport having a maximum operational passenger seating configuration of more than nineteen with one or more emergency exits deactivated shall ensure that the distance(s) between the remaining exits remains (remain) compatible with effective evacuation.
Import to a database application
Integrate into existing CCMS application
Previous questions - and answers
How to identify changes?

When an amended version of a rule is published in the XML format, is there a way to determine what are the changes compared to a previous version?

There are several ways to make a comparison. One is to simply - programmatically - compare the two XML files and extract the changes. In addition to that or as an alternative to this method, you can use the attribute `topic-metadata/@RegulatorySource`. When a topic which appears in one version of a publication is modified in a subsequent version, the value of its attribute `topic-metadata/@RegulatorySource` changes.

For example: The topic with the identifier `ERulesId="ERULES-1963177438-2548"` was present in one version of a rule with the value of the attribute `topic-metadata/@RegulatorySource ="ED Decision 2014/012/R"` If the topic's content is modified in the next version of the rule, then the attribute `topic-metadata/@RegulatorySource` will receive a new value corresponding to the decision that approved the change, for example `topic-metadata/@RegulatorySource ="ED Decision 2018/009/R"`
How to identify changes?

When an amended version of a rule is published in the XML format, is there a way to determine what are the changes compared to a previous version?

There are several ways to identify changes. In addition to the changed textual content, also note what has been added to or removed from the rule.

For example: The topic with the value of the attribute 'RegulatorySource' that approved the change.

Was this helpful? YES
AMC/GM related to IR – how do I identify the relationship in the XML file?

In PDF

5.2.19 Attribute topic-metadata / @ParentIR

Description

Identification of the ‘parent-child’ relationship in a nested structure. Typically, the IR/CS is a ‘child’ topic. That relationship, however,

This attribute holds the title of the ‘parent’ example, for each AMC/GM in a consistent following condition is met:

• the topic has a direct topic parent in the table of contents (ToC) hierarchy.

```xml
<ertopic mId="173277629" sourceId="EASA.16017426-2015" Domain="Aerorome:" ActivityType="Certification:" AircraftUse=" AircraftCategory=" AmendedBy="" ApplicabilityDate="6 March, 2014" EntryIntoForceDate="6 March, 2014" EquivalentForeignRegulation="" ICGRReference="Annex 14:" Keywords="Initial certification; application form; CR proposal; ELOS proposal; certification and design; design; proposed design; aerodrome design; proposed facilities; certification process." RegulatoryState="" RegulatedEntity="Aerorome operator" RegulatorySource="Implementing Regulation (EU) 2020/469" RegulatorySubject="Part-ADR.OR:" TechnicalSubjectMaster="" TypeContent="GM to IR (Guidance material to implementing rule);"

<ertopic mId="1407406061" sourceId="EASA.16017426-2015" Domain="Aerorome:" ActivityType="Certification:" AircraftUse=" AircraftCategory=" AmendedBy="" ApplicabilityDate="6 March, 2014" EntryIntoForceDate="6 March, 2014" EquivalentForeignRegulation="" ICGRReference="Annex 14:" Keywords="Expression of interest; preliminary meeting; pre-application" RegulatoryState="" RegulatedEntity="Aerorome operator" RegulatorySource="EO Decision 2014/012/RE" RegulatorySubject="Part-ADR.OR:" TechnicalSubjectMaster="" TypeContent="GM to IR (Acceptable means of compliance to implementing rule);"

<ertopic mId="142678848" sourceId="EASA.16017426-2015" Domain="Aerorome:" ActivityType="Certification:" AircraftUse=" AircraftCategory=" AmendedBy="" ApplicabilityDate="6 March, 2014" EntryIntoForceDate="6 March, 2014" EquivalentForeignRegulation="" ICGRReference="Annex 14:" Keywords="Application form" RegulatoryState="" RegulatedEntity="Aerorome operator" RegulatorySource="ES Decision 2014/012/RE" RegulatorySubject="Part-ADR.OR:" TechnicalSubjectMaster="" TypeContent="GM to IR (Acceptable means of compliance to implementing rule);"

<ertopic mId="157122266" sourceId="EASA.16017426-2015" Domain="Aerorome:" ActivityType="Certification:" AircraftUse=" AircraftCategory="
Questions?
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   & Go to Get notified section, click Follow this item
3. Decide how to stay informed
   → Your stream on the EASA Homepage
   → Email
   → Push notification

Go to the event